

CLAIM AMENDMENTS

1 1. (Currently amended) A process, comprising the step of:
2 computing, via digital signal processing, one or more performance parameters of
3 a fiber optic gyroscope to determine a relationship between a performance parameter
4 and a physical parameter associated with fiber optic gyroscope components through
5 employment of a closed-loop transfer function based on at least one characteristic of:
6 one or more optical components of the fiber optic gyroscope; and
7 one or more electrical components of the fiber optic gyroscope;
8 wherein the closed-loop transfer function has a frequency response of at least
9 1400 Hz.

1 2. (Previously presented) The process of claim 1, wherein the step of
2 computing, via digital signal processing, the one or more performance parameters of the
3 fiber optic gyroscope to determine a relationship between a performance parameter and
4 a physical parameter associated with fiber optic gyroscope components through
5 employment of the closed-loop transfer function based on the at least one characteristic
6 of the one or more optical components of the fiber optic gyroscope and the one or more
7 electrical components of the fiber optic gyroscope comprises the step of:
8 computing one or more performance parameters of the fiber optic gyroscope
9 through employment of one or more physical parameters of at least one of the one or
10 more optical components and at least one of the one or more electrical components.

1 3. (Previously presented) The process of claim 2, wherein the step of
2 computing the one or more performance parameters of the fiber optic gyroscope
3 through employment of the one or more physical parameters of the at least one of the
4 one or more optical components and the at least one of the one or more electrical
5 components comprises the steps of:

6 determining one or more relationships between the one or more performance
7 parameters and the one or more physical parameters; and

8 employing at least one of the one or more relationships to compute the one or
9 more performance parameters.

1 4. (Previously presented) The process of claim 3, wherein the step of
2 employing the at least one of the one or more relationships to compute the one or more
3 performance parameters comprises the steps of:

4 substituting one or more known values of the one or more physical parameters
5 into the one or more relationships; and

6 employing the one or more known values of the one or more physical parameters
7 to compute the one or more performance parameters.

1 5. (Original) The process of claim 3, further comprising the step of:

2 determining one or more desired values of the one or more physical parameters
3 for employment in causation of the one or more performance parameters to equal or
4 approach one or more provided performance parameter values for the fiber optic
5 gyroscope.

1 6. (Original) The process of claim 5, wherein the step of determining the one
2 or more desired values of the one or more physical parameters for employment in
3 causation of the one or more performance parameters to equal or approach the one or
4 more provided performance parameter values for the fiber optic gyroscope comprises
5 the step of:

6 employing the one or more desired values of the one or more physical
7 parameters to design the fiber optic gyroscope to equal or approach the one or more
8 provided performance parameter values.

1 7. (Previously presented) The process of claim 3, wherein the step of
2 employing the at least one of the one or more relationships to compute the one or more
3 performance parameters comprises the step of:

4 employing the at least one of the one or more relationships and one or more
5 initial values of the one or more physical parameters to compute the one or more
6 performance parameters.

1 8. (Previously presented) The process of claim 7, wherein the step of
2 employing the at least one of the one or more relationships and the one or more initial
3 values of the one or more physical parameters to compute the one or more
4 performance parameters comprises the steps of:

5 determining a difference between the one or more performance parameters and
6 one or more provided performance parameter values for the fiber optic gyroscope;

7 iteratively adjusting at least one of the one or more initial values of at least one of
8 the one or more physical parameters through employment of the at least one of the one
9 or more relationships; and

10 iteratively computing the one or more performance parameters through
11 employment of the at least one of the one or more relationships and the at least one of
12 the one or more initial values.

1 9. (Original) The process of claim 2, wherein the one or more physical
2 parameters comprise one or more of:

3 an optical power of a light beam in a representation of a first phase modulator in
4 a representation of a feedforward component of the closed-loop transfer function of the
5 fiber optic gyroscope;

6 an operating phase bias applied to one or more counterpropagating light beams
7 in the representation of the first phase modulator in the representation of the
8 feedforward component of the closed-loop transfer function of the fiber optic gyroscope;
9 a photodetector scale factor in a representation of a photodetector in a
10 representation of a signal digitizer in the representation of the feedforward component
11 of the closed-loop transfer function of the fiber optic gyroscope;

12 a preamplifier impedance in a representation of a preamplifier in the
13 representation of the signal digitizer in the representation of the feedforward component
14 of the closed-loop transfer function of the fiber optic gyroscope;

15 a preamplifier gain of the preamplifier in the representation of the signal digitizer
16 in the representation of the feedforward component of the closed-loop transfer function
17 of the fiber optic gyroscope;

18 a gain in voltage in a representation of a filter after the photodetector and the
19 preamplifier and before an analog-to-digital converter in the representation of the signal
20 digitizer in the representation of the feedforward component of the closed-loop transfer
21 function of the fiber optic gyroscope;

22 a gain in a representation of the analog-to-digital converter of the representation
23 of the signal digitizer in the representation of the feedforward component of the closed-
24 loop transfer function of the fiber optic gyroscope;

25 a digital truncation gain in a representation of a truncator in a representation of a
26 demodulator in a representation of a feedback component of the fiber optic gyroscope;

27 a transit time for the light beam to propagate through a representation of an
28 optical waveguide in the representation of the feedback component of the closed-loop
29 transfer function of the fiber optic gyroscope; and

30 a phase modulator scale factor in a representation of a second phase modulator
31 in the representation of the feedback component of the closed-loop transfer function of
32 the fiber optic gyroscope.

1 10. (Previously presented) The process of claim 1, wherein the closed-loop
2 transfer function comprises:

3 a summing point that receives:

4 an input based on a rate of rotation of an optical waveguide of a feedback
5 component and a scale factor based on a wavelength of light propagating through the
6 optical waveguide, an optical path length of the optical waveguide, and a diameter of
7 the optical waveguide, as a positive input; and

8 an input based on a modulated first light beam and a modulated second light
9 beam exiting the optical waveguide of the feedback component as a negative input;
10 wherein the summing point employs the positive input and the negative input to
11 determine a difference between the positive input and the negative input;
12 a feedforward component that receives the difference between the positive input
13 and the negative input as an input;
14 wherein the feedforward component employs the difference between the positive
15 input and the negative input to provide a signal proportional to a phase difference
16 between the modulated first light beam and the modulated second light beam exiting the
17 optical waveguide of the feedback component as an output; and
18 wherein the feedback component receives the signal proportional to the phase
19 difference between the modulated first light beam and the modulated second light beam
20 exiting the optical waveguide of the feedback component as an input; and
21 wherein the feedback component employs the signal proportional to the phase
22 difference between the modulated first light beam and the modulated second light beam
23 exiting the optical waveguide of the feedback component to produce a feedback signal;
24 and
25 wherein the feedback component employs the feedback signal to produce the
26 modulate first light beam and the modulated second light beam exiting the optical
27 waveguide of the feedback component.

1 11. (Currently amended) An article A computer-readable medium having
2 computer executable instructions for performing steps, comprising:
3 one or more storage media readable by a processor,

4 means in the one or more storage media for computing, via digital signal
5 processing, one or more performance parameters of a fiber optic gyroscope to
6 determine a relationship between a performance parameter and a physical parameter
7 associated with fiber optic gyroscope components through employment of a closed-loop
8 transfer function based at least one characteristic of:
9 one or more optical components of the fiber optic gyroscope; and
10 one or more electrical components of the fiber optic gyroscope;
11 wherein the closed-loop transfer function has a frequency response of at least
12 1400 Hz.

1 12. (Currently amended) The article computer-readable medium of claim 11,
2 wherein the means in the one or more storage media for computing, via digital signal
3 processing, the one or more performance parameters of the fiber optic gyroscope to
4 determine a relationship between a performance parameter and a physical parameter
5 associated with fiber optic gyroscope components through employment of the closed-
6 loop transfer function based on the at least one characteristic of the one or more optical
7 components of the fiber optic gyroscope and the one or more electrical components of
8 the fiber optic gyroscope comprises:
9 means in the one or more storage media for determining one or more
10 relationships between one or more physical parameters and one or more performance
11 parameters of:
12 at least one of the one or more optical components; and
13 at least one of the one or more electrical components; and

14 means in the one or more storage media for employing at least one of the one or
15 more relationships to determine the one or more performance parameters.

1 13. (Cancelled)

1 14. (Currently amended) The article computer-readable medium of claim 12,
2 wherein the one or more performance parameters comprise one or more of a bandwidth
3 of the fiber optic gyroscope, a coefficient of random walk of the fiber optic gyroscope, an
4 operating frequency of the fiber optic gyroscope, and a power spectral density of noise
5 of the fiber optic gyroscope.

1 15. (Currently amended) The article computer-readable medium of claim 14,
2 wherein the coefficient of random walk of the fiber optic gyroscope is computed as a
3 function of optical power noise, shot noise, analog-to-digital converter quantization
4 noise, preamplifier thermal noise, preamplifier current noise, preamplifier voltage noise,
5 phase modulation, and gain.

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